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VISION

Chemistry that transforms light into sight

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CHEMICAL & ENGINEERING
NEWS

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News of the Week

■ **OSHA issues final regulations on labeling hazardous chemicals in the workplace.** **Page 4**

■ **Congress kills funding for binary chemical weapons.** **Page 5**

■ **Researchers find way to channel intense beam of light through glass fiber.** **Page 5**

■ **Quiet year predicted on the labor front in 1984, despite some major union negotiations.** **Page 5**

Business

American Hoechst earnings will be up markedly this year, largely because of general reorganization and streamlining moves. **Page 9**

International Business

U.S. trade balance in chemicals and other basic manufactures could get much worse because of disadvantage in labor costs. **Page 10**

Government

Superfund needs more money to continue cleanup procedures; chemical industry supports extension of 1985 deadline. **Page 15**

Data show a 7% drop in federal support for R&D from fiscal 1980 to fiscal 1981, confirming earlier predictions. **Page 16**

Science

National Science Board report presents a broad view of the extent and variety of university/industry research interactions. **Page 21**

Education

Shortage of qualified toxicologists prompts new programs offering bachelor degrees in toxicology. **Page 22**

Books

"Renewable Energy: The Power to Choose" by Daniel Deudney and Christopher Flavin documents accomplishments in the field. **Page 37**

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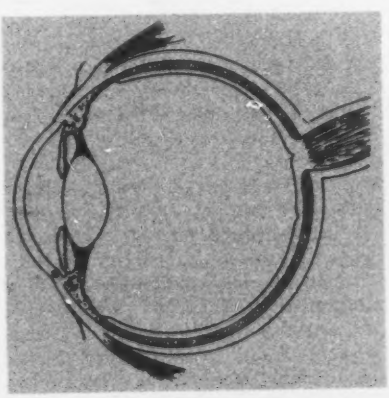

Special Report

The process by which the eye transforms light into sight has scientists looking for clues at molecular level. **Page 24**

Study Updates Academe/Industry Research

The possibility of universities tapping industrial research funds to support their own research projects has been getting a great deal of attention in the past few years.

Universities see it as a way to mitigate, in part, the consequences of severe cutbacks in federal research support, companies see it as a useful investment to help secure a future supply of high-quality scientific manpower, and the federal government sees it as an increasingly important factor in its efforts to assure continued U.S. pre-eminence in high-technology industries.

A comprehensive look at just where these cooperative efforts stand, in the form of a year-long study by Lois S. Peters, research associate, and Herbert I. Fusfeld, director, both of New York University's Center for Science & Technology Policy, has just been published by the National Science Board. The study was commissioned by NSB to serve as background material for its most recent annual report to Congress that focused on this issue. That report, issued last February, concluded that interactions between universities and industry to support research are vigorous, varied, and growing in importance (C&EN, Feb. 21, page 18).

The study presents a broad view of the extent and variety of current university/industry research interactions and tries to characterize the principal types, identify the factors that appear important in the formation of such interactions, and provide some perspective on the current state of university/industry interactions.

"The most successful interactions are almost always initiated and nurtured by a key individual who is energetic and has a belief that the success of this program is essential to his or her professional development," the study finds. Successful programs are much more likely to begin at the university, but not in the top levels of university administration. Often the university's endowment or other financial resources are critical to getting cooperative projects off the ground, since industry is much more apt to support an existing program than to participate in the creation of a new area of research at a university.

One key role that the government has sometimes played in successful university/industry cooperative programs is to catalyze this early funding, the study suggests. In several cases, such as Massachusetts Institute of Technology's Polymer Processing Center, a direct grant from the government supported the project in its initial stages.

The most important measurable "product" of university/industry cooperative research, especially from industry's point of view, usually is highly trained Ph.D. recipients, the study says. Graduates from these cooperative programs usually take jobs in industry, and as the number of cooperative programs grows, "there is the belief that the number of Ph.D.s oriented to an industrial career will increase, or at least new Ph.D.s will be better prepared to meet industrial needs," the study says. Cooperative programs that produce research results "directly related to technical change are rare, if they occur at all," it continues. However, the programs rarely are set up with this goal in mind. Particularly on the industrial side, "the interest is in students and access to new ideas rather than to a specific product, process, or service."

Although university/industry cooperation is flourishing in many senses, the report does not paint an entirely rosy picture of these interactions. Every university involved in the study cited conflicts over patenting arrangements and the related question of restrictions of information dissemination as a barrier to university/industry interaction.

Another difficulty, from the university's point of view, is that industrial support tends to come in small, short-term allotments on the order of $10,000 to $20,000 for one year or less. This leads some university scientists to focus their efforts to secure research funding on the federal government, which tends to give larger, longer-term grants. Most companies do not appear to be geared toward long-term commitments to basic research support.

Still another problem in many academic fields, including chemistry, is the psychological barrier academic scientists feel about interacting with industry. "The more basic the research, the greater the feeling is that industry will, in some way, impede the ability of the individual investigator to follow his or her own perceived optimal course," the study finds, even in fields like chemistry.

Copies of the study, entitled "University-Industry Research Relationships: Selected Studies," stock number 038-000-00534-1, are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, for $7.00 per copy. □

Most common research interaction is cooperative research . . .

Type of interaction	% falling into that category
Cooperative research	61%
Technology transfer	14
Knowledge transfer	13
General research support	11
TOTAL	100%

. . . which can take many forms

Type of interaction	% falling into that category
Grants & contracts	45%
Cooperative research centers	25
Special interest liaison programs	23
Research consortia	5
Collaborative interactions	2
TOTAL	100%